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Patent Claims

1. Method for the non-invasive analysis of control and regulation processes in human and animal metabolism for the diagnosis of diseases and preventive examinations, for routine examinations of occupational groups and sports people with high levels of physical and psychological stress, for therapy control, for the process of dialysis and apheresis treatment and for the determination of the need for antioxidants, **characterised in that** the substances relevant to the metabolism, which react with each other during metabolism processes, are converted into each other and/or affect each other in their concentration and reactivity and which exhibit an (endogenous) autofluorescence, are determined as to their fluorescence intensity and thus indirectly to their concentration, are put into mathematical relation to each other according to biochemical requirements and compared to indication-specific models defining the metabolism state of diseases.

2. The method according to claim 1, **characterised in that** the indication-specific models consist of several (however at least 6) calculated values corresponding to the respective metabolism state of the clinical picture and are calculated from the fluorescence intensities by means of mathematical combinations such as quotients, products, sums, subtractions or more complex formulas.

3. The method according to claims 1 and 2, **characterised in that** the fluorescence intensities are measured in the wavelength range of 287 nm to 800 nm, preferably from 340 nm to 600 nm, for metabolism-relevant substances the emission wavelengths of which are known, preferably ATP, GTP, FAD, NADH, NADP, kynurenine, orotic acid, thromboxane and tryptophan.

4. The method according to claims 1 to 3, **characterised in that** the measuring of the fluorescence intensities takes place at a defined point in time and/or at defined intervals so that control and regulation processes are detected by means of these process measurements.

5. The method according to claims 1 to 4, **characterised in that** at a defined point in time of measuring, the patient suffers psychological or physiological stress, the fluorescence intensities are measured several times before and after the stress load and the regulation process in the metabolism is determined.

6. The method according to claims 1 to 5, **characterised in that** biologically active substances exhibiting an autofluorescence are stimulated for emission by means of light with an excitation wavelength of 287 nm to 340 nm, preferably 340 nm, in the cellular and intercellular area.

7. The device according to claims 1 to 6, **characterised in that** the areas stimulated to emit fluorescence are located at the earlobe, the hand and the nostril, preferably the crease between the thumb and index finger.

8. Device for carrying out the method according to the preceding claims, **characterised in that** the monochromatic light necessary for the excitation is produced by means of a source of light (5), preferably a laser or an Xe flashlamp with an optical filter and directed to the site of measurement via a fibre optic cable (1).

9. The device according to claim 8, **characterised in that** the emitted light of the autofluorophore is directed, via a fibre optic cable (2), from the site of measuring to a spectrometer (6) comprising a CCD line sensor or an acusto-optical monochromator and photomultiplier and after digitalisation of the values measured, the emission intensities are analysed by suitable computing structures (7).

10. The device according to claims 8 to 9, **characterised in that** the analysis in the computing structures takes place by means of mathematical models of biological regulation systems and/or self-learning systems.